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3420 Evaluation
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Biological Evaluation of Laguna Mountain Area, Descanso Ranger District, Cleveland National Forest

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ABSTRACT

An evaluation of five campgrounds, a picnic grounds, and a nature trail on the Descanso Ranger District, San Bernardino National Forest revealed a high level of western dwarf mistletoe on Jeffrey pines. Many overstory and understory pines were heavily infected. Annosus root disease centers were present in three campgrounds. Management alternatives for the dwarf mistletoe problem are presented. Guidelines for the implementation of suggested dwarf mistletoe suppression treatments are included in the attached "Guideline for the use of FPM Funding for suppression of Western Dwarf Mistletoe in California Recreation Areas".

INTRODUCTION

Laguna Mountain Recreation Area, Descanso Ranger District, Cleveland National Forest is a wooded plateau at 5200-6400 feet elevation, east of San Diego, California. As the forested area most accessible to the inhabitants of San Diego and surrounding communities, it receives as many as 1.5 million visitor-days of use per year. Several campgrounds, picnic areas, summer homes, and organizational camps are located on land administered by the Forest Service.

Laguna Mountain contains about 7,100 acres of timber in the yellow pine type, dominated by Jeffrey pine, Coulter pine, and California black oak, with a minor component of canyon live oak and incense-cedar. Coast live oak can be found along the fingers of the plateau, and Parry pinyon pine occurs on the eastern, abrupt edge of the plateau.

Insects and diseases have received considerable attention on Laguna Mountain. Insect control measures aimed at reducing tree mortality caused by the western pine beetle and California flatheaded borer have been carried out since the 1950s. Many workers are now of the opinion that mortality is the result of more than just insect activities and that climatic factors and diseases play an important role. Surveys to locate western dwarf mistletoe have shown that this disease agent is present over much of the forested area of the mountain and is extremely heavy in localized areas. Annosus root disease, which has been noted since the early 1940s, is common, widespread, and very severe in the Jeffrey pine stands. Armillaria root disease caused by Armillaria sp. also contributes to mortality of Jeffrey pine and other tree species. Wood and others (1979) were of the opinion that 90 percent of the mortality of Jeffrey pines was due to a combination of California flatheaded borer, dwarf mistletoe, and annosus root rot. In spite of the many past suppression efforts, tree mortality continues to occur at high levels on Laguna Mountain. The increases in recreation use are often accompanied by further deterioration of sensitive stands and increased levels of pest-caused tree mortality. The objective of this evaluation was to determine if there were areas on Laguna Mountain Recreation Area where effective dwarf mistletoe suppression measures could be applied.

On September 6, 1989, James Allison and Melissa Marosy, Plant Pathologists, Forest Pest Mananagement, examined recreation sites in the Laguna Mountain Recreation Area. They were assisted by Gloria Silva, Silviculturist, Descanso Ranger District and Debra Deppe, Descanso Ranger District. Most of the observed mortality was in Jeffrey pine. Western dwarf mistletoe infections were widespread, and ranged in intensity from very light to heavy in the areas examined.

OBSERVATIONS

Wooded Hill Group Campground

This campground includes groups of Jeffrey pine, scattered black oak, and a few incense-cedar. Most overstory Jeffrey pine in this campground are heavily infected with dwarf mistletoe (DM). Dwarf mistletoe ratings (DMR) are mostly 4 and 5. Most of the understory is also infested. However, there are scattered areas with no dwarf mistletoe present. Several annosus root disease centers are also present. Treatment strategies (Table 1) would include: 1) planting oaks in annosus centers to stop the spread of annosus root disease; 2) thinning the overstocked stand to relieve stress on individual trees; 3) pruning infected branches; and 4) planting incense-cedar to act as a barrier to spread of the dwarf mistletoe.

Burnt Rancheria Campground

This campground contains Jeffrey pine and black oak with groups of DM-infected pines and annosus root disease-infected pines throughout the campground. Other problems found in this campground include overstocking and true mistletoe in the oaks.

The Lilac Loop is somewhat overstocked, and would benefit from thinning. Dwarf mistletoe infection levels are relatively light; thus, branch pruning and some

tree removal would be beneficial. Multiple entries into this area to eliminate most of the infections could allow for the future planting of pine back to the area.

The Yucca Loop includes a number of trees which could be broom pruned. In some areas, such as near sites 25 and 26, openings could be created and planted with pine. A large annosus center is present in this loop; however, oak regeneration is already present within the centers and should be further encouraged.

Pinyon Loop includes an area (site 43) of trees infected very high in the crowns. Such trees can not easily be branch pruned; in this area thinning could be considered. An opening behind site 52 was planted in February 1989 with pine. There is no infected overstory; however some infected understory trees are present. These could easily be pruned or removed in order to protect the seedlings. The adjacent infected overstory should be removed.

The Amphitheater area contains no understory pine. The majority of the overstory pine are infected. These should be broom pruned when possible.

The Cherry Loop is moderately infested, and would respond well to branch pruning.

The Redberry Loop has low levels of infection, and oaks provide a natural buffer between other adjacent loops. Thinning and branch pruning would be appropriate.

The Mahogany Loop is essentially free of dwarf mistletoe.

In general, strategies (Table 1) for this campgound include: 1) thinning; 2) planting oaks in root disease centers; 3) pruning out DM infection; 4) removing heavily infected Jeffrey pines; 5) broom pruning; 6) planting incense-cedar in areas where Jeffrey pine overstory is infected with DM; and 7) creating a buffer strip between infected and uninfected Jeffrey pine.

Desert View Picnic Grounds

No dwarf mistletoe was found in the Jeffrey pines in this area.

Horse Heaven Group Campgrounds

The Horse Heaven Campground consists of a heavily infested overstory of Jeffrey pine with an infested understory. Black oak are scattered throughout. Pruning would not be practical in this area, due to the size of the trees. Removal of infected trees is also not a viable option, as this would leave very little vegetation on the site. Oak should be favored in anticipation of future pine removal.

The Buttercup Campground has some intermediate and sapling-sized pines in the understory which are lightly infected. Branch pruning and some thinning would be appropriate. Thinning would also serve to release oak which could then serve as a buffer. Incense-cedar could also be planted in openings in this area. Remember that if it is decided not to remove the two largest, heavily infected trees in this area, pruning of the adjacent trees would not be recommended.

The Hollyhock Campground contains mostly larger overstory trees. Smaller trees are present on the north side. The little mistletoe present in these trees could be pruned.

Laguna Family Campground

The Meadows Loop has heavily broomed Jeffrey pine along the road. Thinning and broom pruning would be appropriate in this area. Near site 24 where heavily infected Jeffrey pine are present, 1-0 Jeffrey pine seedlings have been planted. Branch pruning of nearby trees would serve to reduce the inoculum levels to which these seedlings are exposed. Interplanting with resistant species is another alternative for this area.

Shady Loop has heavily infected Jeffrey pine along the road on both sides over an area planted to Jeffrey pine seedlings. Strategies (Table 1) would include: 1) thinning heavily infected pines; 2) planting oaks and incense-cedar in openings; and 3) planting DM-resistant Jeffrey pine in the area that now has susceptible seedlings planted in it.

Hillside Loop has DM-infected Jeffrey pine all along road, to the south and west. Clumps of bark beetle-killed trees are present. Black oak are scattered throughout area. Strategies (Table 1) would include branch pruning, thinning, and planting oaks or incense-cedar in openings.

Sunny Loop has heavily infected Jeffrey pine along the road with DMR's of 3-6. Large brooms are common. Near site #78, heavily infected Jeffrey pine are present in an area where they can infect newly planted Jeffrey pine seedlings. Strategies (Table 1) include branch pruning the infected pine and planting oaks or incense-cedar where susceptible Jeffrey pine seedlings are planted.

Dead End Loop has less DM than do the other loops. Strategies (Table 1) would include pruning out mistletoe infection in trees and thinning overstocked areas.

Roadside Loop contains heavily infected Jeffrey pine along the upper road. Some of these trees have large brooms. An annosus center is present in this loop. Strategies (Table 1) would include 1) thinning; 2) broom pruning; and 3) planting hardwoods in the annosus infection center.

El Prado Group Campgrounds

Big Sage Campground had little DM infection in it. Strategies (Table 1) would include pruning out infected branches and thinning the infected pine.

Manzanita Campground's Jeffrey pine are lightly infected with dwarf mistletoe. Some branch pruning and thinning would be appropriate.
Yerba Santa Campground has moderate dwarf mistletoe infection in the Jeffrey pine. Branch pruning and thinning would be appropriate.

The dwarf mistletoe infections in the Buckwheat Campground range from light in the center of the campground to heavy on the margins. Strategies (Table 1) for this campground would include: 1) branch pruning; 2) thinning; and 3) creating a buffer along the edge of the campground.

Whitethorn Campground has moderate dwarf mistletoe infections in the Jeffrey pine. Branch pruning and thinning would be appropriate.

SUMMARY

Management alternatives for the dwarf mistletoe problems in the Laguna Mountain area include 1) do nothing and 2) implement some or all of the preceeding suggested treatments. If the first alternative is chosen, the dwarf mistletoe will intensify, spread to new regeneration, and continue to cause tree mortality. Jeffrey pine usually inceases one DMR infection class every 10 years, and the most severely infected trees die within 10 to 15 years. Left unmanaged, dwarf mistletoe infested stands gradually deteriorate.

Table 1 summarizes the dwarf mistletoe suppression treatments which might alternatively be implemented in the Laguna Mountain area. Detailed descriptions and guidelines for the implementation of these treatments are included in the attached "Guidelines for the Use of FPM Funding for Suppression of Western Dwarf Mistletoe in California Recreation Areas." By actively managing these campgrounds, they will provide a continuing yield of recreation benefits for generations to come. We recommend that these treatments be applied, alone or in combination, as you see appropriate to help meet your management objectives.

If there are any questions, please contact James Allison (415-705-2565) or Melissa Marosy (415-705-2640).

TABLE 1. APPLICABILITY OF DWARF MISTLETOE TREATMENTS TO AREAS ON DESCANSO RANGER DISTRICT, CLEVELAND NATIONAL FOREST

	TREATMENTS					
AREA	BROOM PRUNE	BRANCH PRUNE	REMOVE OVERSTORY	THIN	BUFFER STRIP	ENCOURAGE SPECIES DIVERSITY
Wooded Hill Group CG	NA[1]	X[2]	NA	X	X	X
Burnt Racheria CG	X	X	X	X	X	X
Desert View Picnic Grounds	NA	NA	NA	NA	NA	NA
Horse Heaven Group CG	NA	X	NA	X	X	X
El Prado Group CG	NA	X	NA	X	X	NA
Laguna CG	X	X	NA	X	NA	X

[1] NA = Not Applicable
[2] X = Available treatment

LITERATURE CITED

Wood, R. E., Schuft, M. J., and Schultz, D. E. 1979. An evaluation of tree mortality in Laguna Mountain recreation area, Cleveland National Forest. USDA, Forest Service, Region Five, Forest Insect and Disease Management, Report No. 79-1. 22 p.